 Discriminative Model Updates

Select only those models for updating which result in predictive behaviors distinct from others in updated model space. How do we identify these models?

We begin by merging individual policy trees bottom up to form a policy graph

Consider 3 candidate models for agent j
\[ \left\{ 0.01, \theta \right\}, \left\{ 0.5, \theta \right\}, \left\{ 0.05, \theta \right\} \]

Model 1 will be updated using both L, GL and L, GR
Model 2 will be updated using L, GL but not L, GR because the latter update will result in a behaviorally equivalent model
Model 3 will not be updated at all as any updated model will be behaviorally equivalent

Experimental Results

We compare our approach of using discriminative model updates (DMU) with a previous approximation technique: A-Means model clustering (MC).

We used two benchmark problems: Multiagent tiger and Multiagent machine maintenance.
I-DIDs are solved and the policies are executed in a simulated environment.

Discussion

I-DIDs offer a graphical formalism for sequential decision making in multiagent settings. They generalize DIDs to multiagent settings in a natural and intuitive manner.

We proposed an approach that preemptively avoids redundant updates. This leads to computational speed up, I-DIDs close to 20 hours may be solved.